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## TREE-CLIMBERS V. STEEPLE-JACKS.

A RECENT article in *Chambers's Journal* (6th June 1896), entitled 'Steeple-Jacks,' in which is explained the method adopted by those active gentry in their hazardous work of ascending the lofty chimneys of manufactories for the purpose of repair, has put me in mind of a somewhat similar method of climbing lofty trees employed by the Karens in the jungles of Burma.

In the course of my frequent wanderings in those jungles, I occasionally noticed a number of pegs stuck one above another high up in some huge tree. That they had been fixed there to help a man in climbing, and by the one who had so climbed, was evident, but in what way they could have been fixed, and how, after being so fixed, it was possible to climb by their means, I was at a loss to understand; because it was plain that, if used as steps for the feet, the weight of a man's body would deflect them, and the man would inevitably fall off, as they were but slender pegs, and had no visible support other than that given by the tree. The trees in which these pegs were seen were of great height and girth, sometimes eighty or a hundred feet from the ground to the first bough, and offered no projection of any kind which could be utilised by hand or foot, and were far too bulky to be clasped round. To give an idea of the size of some of these trees, I may mention that I once measured one that had fallen across a mountain-stream and thus afforded a good opportunity for accurate measurement, and I found it to be one hundred and forty feet to the first branch. All I could extract from my native followers, generally Burmans, in reply to my questions on the subject of the pegs, was that they were placed there by Karens to enable them to climb the tree to get at the wild bees' nests and take the honey.

So for a long time my curiosity remained unsatisfied. But eventually fortune favoured me. On a subsequent occasion, this time accompanied by a friend, I again caught sight of the familiar pegs, and pointed them out to

him; he was as puzzled as I had been to account for their position. It happened, however, luckily on this occasion that we had two or three Karens in our company, and they, when they were told of our surprise, offered to show us practically how the thing was done. We halted accordingly, and, sitting down, watched their proceedings with considerable interest. It was rather a lengthy business, and I will try to describe it, as it will probably prove as new to my readers as it was to ourselves.

The first thing done was to select and cut down two or three bamboos of suitable length and size, say thirty or forty feet long, and about as thick as a man's wrist or forearm, and then to cut and trim into shape several dozen bamboo pegs about a foot long. This done, and the material being now ready, the men proceeded to chop out a hole on both sides of the bamboo just above the *septum* (or joint, if you will) all the way along, sufficiently large to allow the pegs to be pushed through. And now the man who was to ascend the tree rested one of the bamboos against the trunk, having first cut a notch out of the top—the use of which will appear presently; then, filling his bag with the pegs, and having a piece of wood in his hand to serve as a mallet, he made preparation for the ascent in the following manner.

But here I must pause to describe the ordinary dress of a Karen; it will not take long, as it is simplicity itself, consisting, in fact, of only one garment, if we except the wisp of dirty cloth twisted into his long hair. This garment is for all the world like the old-fashioned, now long-discarded, agricultural labourer's smock-frock, but without sleeves, the arms being thrust through slits at the shoulders. This, with a large square bag, of the same home-made cotton material as the smock, hung by a broad strap across one shoulder, and the inevitable *dha* (a kind of long heavy chopper-knife) in his hand, forms a Karen's complete costume. All the Karens dress alike. This bag contains invariably the dearly-loved betel-nut, the prepared lime in

a small box, and the leaves of the betel-pepper (which, put together, he is constantly chewing), with any other trifles he may choose to carry with him. Approaching the tree, then, the Karen takes a peg out of his bag, and pushing it through the lowest hole in the bamboo, drives the sharpened end into the tree; then a second peg through the second hole, and so on upwards, a peg in every hole, as far as he can reach standing on the ground. Thus far all was easy enough; but at this point, as it appeared to us, the difficulty began. What would the man do next? There was no hesitation, however.

If I have succeeded in making myself understood, it will be apparent to the reader that the pegs, thus inserted, were supported at one end by the trunk of tree, at the other by the bamboo on the *septa* of which they rested; the trunk of the tree corresponding to one side-pole of a ladder, while the bamboo represented the other pole, the pegs themselves forming the rungs.

Without any hesitation the Karen put one foot on the lowest rung—there being just room for it between the tree and the bamboo—and, raising himself from the ground, he inserted and drove in a peg above the last which he had been able to put in while standing on the ground. Then, with his other foot on the next rung, he again drove in a peg higher up, and so on. Ascending rung by rung, he fixed peg after peg, one above another, until he had reached the top of the bamboo—that is, the end of the first pole. With increased interest and some nervousness, we watched to see what he could possibly do next, as the difficulty of farther ascent now seemed really insuperable. Still no hesitation. One of the men below handed him up a second bamboo in which holes as described had been already cut, taking the precaution first to make a notch at the *bottom* of it to correspond with and fit into the notch previously cut in the *top* of the first. This bamboo the man above took hold of, balancing and raising it perpendicularly hand-over-hand until he was able to place the bottom of it on the top of the first, notch in notch. He then proceeded to deal with this second bamboo exactly as he had done with the lower one, driving in pegs one by one as he went up step by step from the bottom to the top, where he now stood, quite at his ease apparently, ready to receive yet a third bamboo which his fellow below was preparing to reach up to him by himself going up the lower of the two already fixed. This, however, we would not allow: we had seen enough. Nothing further was to be gained, as the feat had been performed simply for our gratification, and we were heartily glad when we saw the man safe at the bottom again.

The mystery of the pegs was solved: those I had seen far up on a tree, here and there, were a few that had withstood decay after the bamboos had fallen or been removed, and probably had been in the tree for several years.

Now, I do not know if the extreme difficulty of the above-mentioned performance has been sufficiently realised. To us who witnessed it, it appeared wonderful—so much so, indeed, that had we been only told and not seen it, we should have been slow to credit the truth of the story.

It should be remembered that the bamboos were in no way fastened to the tree, because the

pegs had no heads to them and projected but a little way outwards. They did not act as nails, only as supports; consequently, had the climber, in any part of his ascent, leaned ever so little outwards instead of inwards and towards the tree, the bamboos must inevitably have slipped off the pegs and fallen, hurling the man to the ground. This appears to be the most astonishing part of the performance—I mean, the perfect balancing of himself on such an insecure foundation all the time his hands were occupied with building his own ladder!

It must be borne in mind, further, that the second bamboo was simply lodged loosely on the top of the first by a notch, and that the rungs were only sufficiently broad to allow one foot to rest on them at a time—that is, the distance between the tree and the bamboo was no more than the natural breadth of the foot; and again, that the man did his work hampered by his loose smock-frock. We remarked, indeed, that this seemed a hindrance to him, and we were told that it was only out of respect to us that he went up so clad, and but for our honoured presence he would have divested himself of his garment.

When all these conditions are considered, I think it will be admitted that the feat here performed by these half-civilised denizens of the jungle rivals, if it does not surpass, that of our steeple-jacks, who, though they may ascend to greater heights, are assisted in their work by all the machinery that science and long experience enable them to command.

## MY LORD DUKE.\*

### CHAPTER VI.—A NEW LEAF.

'THE Duke of St Osmund's and Mr Claude Lafont left town yesterday for Maske Towers, the family seat near Devenholme.' So ran the announcement in the morning papers of the next day but one; and the Duke was actually exploring his inheritance when it appeared.

Overnight the pair had arrived too late to see much more than the lofty, antique hall, and the respective rooms in which they were to sup and sleep; but the birds awoke Jack in the early morning, and he was up and out before seven o'clock.

As yet he had seen little that attracted him within, and at this hour he felt a childish horror of the dark colossal canvases overhanging the grand staircase and the hall; like the sightless suits of armour standing blind sentinel below, they froze him with the look of lifeless life about the grim, gigantic figures. He was thankful to see one of the great double doors standing open to the sun; it let him out into a stone portico loftier than the hall; and folding his arms across a cold balustrade, the whilom bushman looked forth between Corinthian columns like the masts of a ship, and was monarch of all he beheld.

A broad and stately terrace ran right and left below; beyond and below this, acres of the smoothest, greenest sward were relieved by a few fine elms, with the deer still in clusters about their trunks. The lawn sloped quietly to the verdant shores of a noble lake; sun and dew

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had dusted the grass with silver; sun and wind were rippling the lake with flakes of flame, like leaping gold-fish; and across the water, on the rising ground, a plantation of young pines ran their points into the radiant sky. These appealed to the Duke more than anything he had seen yet. His last bush hut had been built among pines; and such is the sentimental attraction of the human heart towards a former condition—good, bad, or indifferent, if it be but beyond recall—that the Duke of St Osmund's had to inspect that plantation before anything else. Leaving the Towers behind him, unnoticed and indeed forgotten, he crossed the lawn, skirted the lake, and plunged amid the pine-trees as his impulse beckoned; but on his way back, a little later, the mellow grandeur of that ancient pile broke in upon him at last; and he stood astounded in the wet grass, the blood of possession running hot in his veins.

The historic building stretched on this side for something like a quarter of a mile from end to end; here the blue sky sank deep between turret and spire; and there it picked out a line of crumbling battlements, or backed the upper branches of an elm that (from this point) cut the expanse of stone in two. It had grown out of many attempts in as many ages; thus, besides architectural discrepancies for the eyes of the few, the shading of the walls was as finely graduated as that of an aging beard, but the prevailing tint was a pearly gray, now washed with purple, and exquisitely softened by the tender haze still lingering in the dewy air. And from every window that Jack could see flashed a morning sun; for, as he stood and looked, his shadow lay in front of him along the milky grass.

To one extremity of the building clung an enormous conservatory, likewise ablaze from dome to basement; at the other, the dark hues of a shrubbery rested the eye; but that of the Duke was used to the sunlit desert, and not readily dazzled. His quick glance went like a bullet through the trees to a red gable and the gilt hands of a clock just visible beyond. On the instant he recovered from his enchantment, and set off for the shrubbery at a brisk walk; for he had heard much of the Maske stables, and evidently there they were.

As he was in the shrubbery the stable clock struck eight after a melodious chime sadly spoilt by the incessant barking of some small dog; the last stroke reverberated as he emerged; and the dog had the morning air to itself, to murder with its hideous clamour. But the Duke now saw the exciting cause, and it excited him; for he had come out opposite the stable-yard gates, which were shut, but from the top of which, with its lame paw lifted, a vertical tail, and a back like a hedgehog asleep, his own yellow cat spat defiance at an unseen foe. And between the barks came the voice of a man inciting the dog with a filthy relish.

'Set him off, Pickle! Now's your time. Try again. Oh, blow me! if you can't you can't, and I'll have to lend you a hand.'

And one showed over the gate with the word; but the fingers grabbed the air, for Jack had snatched his pet in the nick of time. He was now busy with the ring of the latch, fumbling

it in his fury. The breath came in gusts through his set teeth and bristling beard, like wind through a keyhole. One hand clasped the yellow cat in a fierce caress; the other knotted into a fist as the gate flew open.

In the yard a hulking, smooth-faced fellow, whose pendulous under-lip had dropped in dismay, changed his stare for a grin when he saw the Duke, who was the smaller as well as the rougher-looking man of the two; for he had not only come out without his collar, which he discarded whenever he could, but he had clapped on the old bush wideawake because Claude was not up to stop him.

'Well, and who are you?' began the other cheerfully.

'You take off your coat, and I'll show you,' replied Jack, with a bloodthirsty indistinctness. 'I'm a better man than you are, whoever I am; at least we'll have a see!'

'Oh, will we?' said the fellow. 'And you're the better man, are you? What do you think?' he added, turning to a stable-boy who stood handy with thin brown arms akimbo and thumbs in his belt.

'I wonder 'oo 'e thinks 'e is w'en 'e's at 'ome?' said the lad.

Jack never heard him. He had spied the saddle-room door standing open. In an instant he was there, with the small dog yelping at his heels; in another, he had locked the door between cat and dog, pocketed the key, and returned to his man, stripping off his own coat and waistcoat as he came. He flung them into a corner, and after them his bush hat.

'Now let's see you take off yours! If you don't,' added Jack, with a big bush oath, 'I'll have to hide you with it on!'

But man and boy had been consulting while his back was turned, and Jack now found himself between the two of them; not that he gave the lad a thought.

'Look you here; I'll tell you who I am,' said the man. 'My name's Matt Hunt, and Matt can fight, as you wouldn't need telling if you belonged to these parts. But he don't take on stray tramps like you; so, unless you hook it slippy, we're just going to run you out of this yard quicker than you come in!'

'Not till I've shown you how to treat dumb animals'—

'Then here goes!'

And with that the man Hunt seized one of Jack's arms, while the stable-boy nipped the other from behind, and made a dive at Jack's pocket for the saddle-room key. But a flat-footed kick sent the lad sprawling without harming him; and the man was driven so hard under the nose that he too fell back, bearded with blood.

'Come on!' roared Jack. 'And you, my boy, keep out of the light unless you want a whipping yourself!'

He was rolling up the sleeves from his tanned and furry arms. Hunt followed suit, a cascade of curses flowing with his blood; he had torn off his coat, and a wrist-button tinkled on the cement as he caught up Jack in his preparations. His arms were thicker than the bushman's, though white and fleshy; but Hunt was also the heavier weight, with further advantages in point of height and reach; nor was there any lack of

confidence in the dripping, hairless, sinister face when the two men finally squared up.

They fell to work without niggling, for Jack rushed in like a bull, leading most violently with his left. It was an inartistic start; the big man was not touched; but neither did he touch Jack, who displayed at all events a quick pair of legs. Yet it was this start that steadied the Duke. It showed him that Hunt was by no means unskilled in the use of his hands; and it put out of his head everything but the fight itself, so that he heard no more the small tike barking outside the saddle-room door, hitherto his angriest goad. Some cool sparring ensued. Then Hunt let out from the shoulder, but the blow was avoided with great agility; then Jack led off again, but with a lighter touch, and this time he drew his man. The blows of the next minute it was impossible to follow. They were given and returned with enormous virulence; and there was no end to them until the big man tripped and fell.

'See here,' said Jack, standing over him; 'that was my cat, and I'd got to go for you. But if you've had enough of this game, so have I, and we'll cry quits.'

He was sucking a cut lip as he spoke. The other spat out a tooth and blundered to his feet.

'Quits, you scum? Wait a bit!'

And they were at hotter work than ever.

Meanwhile the yard was filling with stable-men and gardeners, who were in time to see Hunt striding down on his unknown adversary, and the latter retreating in good order; but the stride quickened, ending in a rush, which the Duke eluded so successfully that he was able to hit Hunt hard on the ear as he passed.

It was afterwards a relief to the spectators to remember how they had applauded this effort. To the Duke it was a comfort at the time, but he did not then suspect that his adversary was also his most unpopular tenant. For neither knew or cared who the other might be.

Hunt let out a bellow of pain, staggered, and resumed his infuriate rush; but his punishment was now heavier than before. He had lost both wind and head, and he was losing pluck. One of his eyes was already retiring behind folds of livid flesh; and a final blow under the nose, where the first of all had been delivered, knocked him howling into the arms of a new-comer, who disengaged himself as Hunt fell.

'What, Claude! is that you?' cried the Duke; and a flood of new sensations so changed his voice that Hunt looked up from where he lay, a beaten, bleeding, blubbery mass. But in the silent revelation of that moment there was at first no sound save the barking of the fox-terrier outside the saddle-room door. This had never ceased. Then the coachman's pipe fell from his mouth and was smashed.

'Bless us!' said he. 'It's his Grace himself!'

He had driven the Duke from Devenholme the night before.

'The Duke of St Osmund's!' exclaimed Hunt from the ground. He had been shedding blood and tears indifferently, and now he sat up with a slimy stare in his uninjured eye.

'Yes, that's right,' said Jack, with a nod to the

company. 'So now you all know what to expect for cruelty to cats, or any other dumb animals; and don't you forget it!'

He put on his coat and went over to the saddle-room. Claude followed him, still at a loss for words. And Hunt's dog went into a wild ecstasy as the key was put into the lock.

'Hold him,' said Jack. 'The dog's all right; and I lay his master'll think twice before he sets him on another cat o' mine!'

'Come away,' replied Claude hoarsely; 'for all our sakes, come away before you make bad worse!'

'Well, I will. Only hold him tight. That's it. Poor little puss, then—poor old Livingstone! Now I'm ready; come along.'

But Hunt was in their path; and Jack's heart smote him for the mischief he had done, though his own lower lip was swollen like a sausage.

'So you're the new Duke of St Osmund's,' said Hunt, with a singular deliberation. 'I wasn't to know that, of course; no, by gosh, not likely!'

'Well, you know it now,' was the reply. 'And—and I'm sorry I had to hit you so hard, Hunt!'

'Oh, don't apologise,' said Hunt, with a sneer that showed a front tooth missing. 'Stop a bit, though; I'm not so sure,' he added, with a glance of evil insight.

'Sure of what?'

'Whether you oughtn't to apologise for not hitting a man of your own age!'

'Take no notice of him,' whispered Claude strenuously; but he obtained none himself.

'Nonsense,' said the Duke; 'you're the younger man, at all events.'

'Not me! I was born in '59, I was.'

'Then you're the younger man by four years.'

'By—four—years,' repeated Hunt slowly. 'So you was born in '55! Thank you; I shall make a note of that, you may be sure—your Grace!'

And Hunt was gone; they heard him whistling for his tike when he was himself out of sight, and the dog went reluctantly. Then the coachman stepped forward, cap in hand.

'If you please, your Grace, that man was here without my knowledge. He's always putting in his nose where he isn't wanted. I've shifted him out of this before to-day; and, with your Grace's permission, I'll give orders not to have him admitted again.'

'Who is he?' said Jack. 'A tenant, or what?'

'Only a tenant, your Grace. Matt Hunt, they call him, of the Lower Farm; but it might be of Maske Towers, by the way he goes on!'

'He took a mighty interest in my age,' remarked the Duke. 'I never asked to look at his fangs—but I think you'll find one of them somewhere about the yard. No; I'm not fond of fighting, my lads. Don't you run away with that idea. But there's one thing I can't and won't suffer, and that's cruelty to animals. You chaps in the stables, recollect that! And so good-morning to you all.'

Claude led the way through the shrubbery in a deep depression. The guilty Duke took his arm with one hand, while with the other he hugged the yellow cat, which was watching the shrubbery birds wistfully over its master's shoulder.

'My dear old boy,' said Jack, 'I'm as sorry as



sorry for what's happened. But I couldn't help myself. Look at Livingstone; he'd have been a stiff 'un by this time if I hadn't turned up when I did; so naturally there was a row. Still, I'm sorry. I know it's a bad beginning; and I remember saying in the train that I'd turn over a new leaf down here. Well, and so I will if you give me time. Don't judge me by this morning, old tougher! Give me another chance; and for heaven's sake don't look like that!'

'I can't help it, Jack,' replied Claude, with a weary candour. 'I'm prepared for anything now. You make me a year older every day. How do I know what you'll do next? I think the best thing I can do is to give you up as a bad job!'

(To be continued.)

## A REVOLUTION IN PRINTING.

### THE STORY OF THE LINOTYPE.

WHETHER or not the art of printing originated in China, and the notion of it was imported into Europe by some early traveller, we shall probably never know for certain. But that the Romans actually possessed the art without knowing it is evident from the fact that they stamped their pottery with immovable types, or stereotypes, as we now call them. But now that the art of printing is being revolutionised by a new and ingenious use of stereotypes, we seem yet to be uncertain who was really the first to print from movable types in Europe. It is, of course, usually set down to John (or Johann) Gutenberg of Mainz, who settled in Strasburg about the year 1424. He is called the inventor of typography, which is the art of printing with loose, separate types. But the Dutch assert that printing from types, as distinguished from blocks, was first achieved in Haarlem, and that Laurens Coster, otherwise called Laurentius, was the real inventor. It is contended that John Gensfleisch (or Gutenberg) was one of his workmen, and that on returning to Mainz he made his nephew, John Gutenberg, acquainted with the secret. The types used by Laurentius, however, seem to have been of wood. John Gutenberg the younger went to Strasburg, and began printing in the house of one Dritzehen, by a secret process. Dritzehen died, and some of his family, getting hold of the 'formes,' discovered Gutenberg's secret to be printing from movable metal types cut by hand. Gutenberg then went back to Mainz, and entered into partnership with one John Fust, or Faust, a goldsmith and metal-worker, who supplied the money for the typographical experiments. Somewhere between 1450 and 1455 they brought out what is now known as the Mazarin Bible, probably the first book ever printed from movable metal types. Gutenberg and Fust quarrelled, and Fust, being the capitalist, took possession of the whole printing apparatus, assuming as managing partner an apprentice of Gutenberg's named Peter Schöffer. To this young Schöffer, again, belongs the honour of discovering how to cast type in a matrix. With the siege of Mainz in 1462 the firm was broken up, and their apprentices and workmen became scattered over Europe, carrying with them the art of printing and of casting types. Before the end of the year 1500, printing-presses had been

set up in two hundred and twenty different places.

William Caxton is still believed to be the first who introduced the art of printing into England, although there is a book in existence which professes to have been printed at Oxford in 1468, which is three years prior to Caxton's first book. Whether or not Caxton was the first printer in England, he was the first to use cast-metal movable types here. It does not appear, however, that Caxton was like Gutenberg and his immediate successors in being his own type-founder. Caxton obtained his type from Bruges, where type-founding as a separate art and industry seems to have first settled; afterwards extending over the Continent, and through England and Scotland, where, perhaps, it attained its highest perfection. Among the earliest English type-founders Wynkyn de Worde was the most famous. He it was who first cut the English 'black letter' that served as a model for all future foundry. One of the most famous printers of the sixteenth century, however, John Day, made his own types, and turned out very beautiful books. After his time there was little or no advance in the art of type-founding for about a hundred years. Then began a revolution and the successive development of machinery, until we have now an almost human machine that simply needs to be kept fed with molten metal while turning out automatically the most perfect type ready for the printer's hand.

In the British Museum is a Roman example of stereotype, or logotype. It is a brass plate about two inches long and one inch wide, bearing, in reverse, characters which represent the signature of Cecilius Hermias. It was evidently used for the signature of documents by stamping, as is done by many busy public officials in our own time. It is certainly curious that, with the art of writing, the taste for literary exercises, and the knowledge of means of reproducing written characters, the Romans should have stopped short of the art of printing. They had it, and they knew it not. This ink-stamp is of the fifth century, and not until the fifteenth do we find printing from movable types in Europe. If it is true that the Chinese practised printing three hundred years before Christ, then Christendom was eighteen hundred years behind Heathendom in the most essential art of civilisation. Happily, in the interim were what George Eliot calls the fine old days of leisure. Time was of small value, and the monks had little to do; so that, thanks to their leisure and patience, manuscripts were preserved, reproduced, and handed down from generation to generation.

If we take 1450 as about the time when Gutenberg successfully cast his first type, we have a period of four hundred and thirty-five years before the invention reached its natural development. Gutenberg, in 1450, cast single letters in a mould; and in 1885 Ottmar Mergenthaler cast lines of letters from a matrix. The American Linotype is the lineal descendant of the mould of Mainz. If it has taken a long time to develop, let us not forget how long it took to develop Gutenberg's movable type from the stamp of Cecilius Hermias.

The feature of the new era in printing is the production of letterpress printing without the

use of types at all. Just as there has been the substitution of mechanical for manual labour in type-founding, so now we are seeing the same change in type-setting. To those who know anything about a printing-office, no revolution can seem more complete than one which will employ a machine to do the delicate, dexterous work of the deft compositor in front of his font of types. If there is any industry in which the displacement of manual work seemed well-nigh impossible, it was the setting-up of type for the printing-press—and yet the deposition has begun.

The invention of the Linotype Composing-Machine marks a revolution greater than anything which has occurred in printing during the last four hundred years. It is neither the first nor the only attempt that has been made at what is called 'mechanical composition' as distinguished from ordinary type-setting by hand. But it is the first successful attempt, we believe, to combine type-founding with type-setting, and in point of fact to dispense with fonts of type altogether. And it is a proved success, both mechanically and economically. Even the trade unionists have recognised that the thing has 'come to stay,' and, adapting themselves to the situation, skilled compositors are as quickly as possible transforming themselves into skilful machine-operators.

The Linotype cannot be said to be the invention of any single individual. In its modern form it is a completion of the design of Ottmar Mergenthaler, but the machine in use to-day represents the product of no fewer than fourteen hundred separate patents. That is to say, it is the embodiment of successive improvements, found to be necessary after Mergenthaler's machine came into practical operation. But the idea itself is an old one—as old, one may say, as the stereotyped blocks with which the ancients stamped their pottery. It is a curious thought that on the eve of the twentieth century we are going back to the first, or even earlier, in principle. But without going so far back, we may find the germ of the Linotype in the Logotype which early in the present century found so much favour. The Logotype system was the cutting of blocks of complete words, sections of words, and syllables in frequent use, with the view of avoiding the handling of each separate letter every time these words and syllables are required. But it was found to multiply enormously, instead of to reduce, the number of characters required in a compositor's case, and to be unworkable on a large scale. The Oxford University Press, however, used logotypes, as did others engaged in such 'solid composition' as the printing of Bibles. Just about the time when the Logotype came into favour, cylinder machines were taking the place of hand-presses, so that practically we may lay the foundation of modern mechanical composition in the first quarter of the present century.

First, however, the printing-machine had to be perfected, and the world was not ripe for an invention which one William Church patented in 1822 for the casting of type by machinery, the setting of it in line by machinery, and the automatic delivery by machinery of the printed sheets. In Church's machine of seventy-five years ago we have features which have been

preserved in all type-setting machines ever since, down to the Linotype, such as the keyboard, the arrangement in parallel lines, the use of release-levers and oblique channels to bring the types to a common point, &c. Other inventors followed Church, decade after decade, some with machines for setting type merely, some for casting as well as setting, and some for dispensing with type altogether and using a matrix. Some of these inventions were of no practical use; others of them have been in operation in this country and in America, but never with such unqualified success as to threaten to displace hand-labour. Then came the evolution of the bar-forming machine, which is really the Linotype.

The difference between the Linotype and all previous type-setting machines is material, for the Linotype does not set type at all. It does not compose types, but composes matrices in lines. In ordinary type the characters are in relief on the metal; in a matrix the characters are impressed in intaglio. This was the original thing about Mergenthaler's invention—the dispensing with a magazine, or font, of movable metal types. He had many imitators, but the Court of Appeal in the United States found that he was really the first to 'combine with mechanism for forming a matrix composed of a series of dies adapted for transposition or rearrangement, a mould and a casting mechanism,' and the first to 'produce a practical machine by which ordinary hand composition is superseded.'

The Linotype does not cast letters, it casts lines: hence its name, 'line-of-type.' It has taken twenty years and fourteen hundred patents to bring the machine up to its present state, which may not yet be perfection, but yet is so efficient that it is being adopted in all the principal newspaper offices in the country, and gradually in the great printing-houses. It was unfortunate, perhaps, in being placed on the market too soon, for the first machines were not a success, and caused rather a prejudice against the name—a prejudice which has had to be overcome.

The mechanical compositor has no heavy cases of type to pick and choose from. He sits in front of a machine so compact that it does not occupy more than six square feet of floor-space. Before him is a key-board, not unlike that of a type-writer. When he depresses a key he instantaneously releases a matrix in the magazine above him, bearing a character corresponding to the key. This magazine is placed sloping downwards towards the operator, and the matrices as released drop by natural gravity through vertical channels on to a travelling belt, which carries them as quick as thought, one after the other, into a little compartment on the operator's left, where they 'compose' the words under his eye. The side of this little chamber is open, and on the portion of the matrices exposed to view the characters they represent are marked. In this way the operator can at once detect any literal error as it occurs, extract the wrong matrix and insert the correct one in an instant, without stopping the machine. When the little chamber, or block, which is adjusted to the width of the column to be printed, is about full it announces the fact by ringing a bell, thus giving the operator time to see how much more he can get in. Then by the touch of

a lever the operator sends the line on a stage to the moulding wheel, connected with which is a pot of molten metal, kept hot by gas-burners. Half a turn of this wheel forces out a charge of molten metal and presses it into the incised letters on the matrices. The line is thus cast in an instant in a single solid bar. An arm now comes down with a swoop from the top of the machine, seizes the matrices and places them on a distributing bar, perhaps the most wonderful part of the machine, and almost human in its intelligence. Each matrix is a thin piece of brass, and on the opposite end to the letter is toothed something like a Chubb's lock, and by means of these teeth it hangs on to corresponding teeth on the bar, along which the matrices are forced by a worm-wheel. At intervals there are vacancies on the bar, and a matrix on reaching one of these vacancies loses its grip there and drops into its own proper groove, and runs into the magazine ready for use again. No matrix can drop off the bar until it reaches its own box, nor can it be carried beyond, for the slightest disturbance of the adjusted teeth causes the machine to stop.

Now to come back to the cast 'line-of-type.' The mould-wheel, in returning to position after having ejected the metal, forces the line or bar out into a receiving galley, where a little automatic arm holds all the lines in position until the 'take' is full—say one hundred lines or so. Then the operator lifts it out, sends it away for proof, and starts at once on his next 'take.' The movement is continuous. While he is setting one line of type by his key-board, another is being cast, and the matrices are being redistributed as fast as he can use them. At the side of his key-board is a little lever by which he introduces space-bands to divide the words. These bands are of tapering thickness, so that the spaces can be made as close or as wide as desired, and all is done as smoothly and effectively as if by the human hand. This automatic justifying is a thing that used to be accounted an impossibility, but it is done, and all because matrices are used instead of metal types.

But it is practically impossible by mere verbal description to give an adequate representation of this marvellous machine, which comprises two thousand separate pieces of mechanism. It is a combination of the ideas of many minds adjusted to this particular purpose. Seated at his key-board, the modern printer is both machinist, type-setter, justifier, type-founder, and type-distributor. Motive-power is supplied to him by shafting from some central steam or gas engine, and all he has to do is to manipulate his key-board and keep his melting-pot supplied with metal, while, of course, using his eyes to see that the right matrices are coming into position. The old type-setting machines required three operators, one for the key-board, one to keep up the supply of type, and one to 'justify' the lines.

Into the technical questions of cost and relative quality of work this is not the place to enter. Probably the machine has not been sufficiently long in use to afford positive and precise answers on these points. The saving, of course, is in the labour, which means wages, and the amount of that saving must depend on the skill and rapidity of the individual operators. To transform a

compositor into a machine-operator is a work requiring some little time, and probably the next generation of operators will be much more expert. It is claimed that matter can be linotyped from six to ten times more rapidly than the most expert compositor can set up types in his composing-stick, and it is stated that the saving in cost is or should be about 40 per cent. Each machine is capable of turning out fourteen thousand letters per hour; but no operator can keep up such a speed; and from eight thousand to ten thousand per hour seems to be about the output of an expert, while even beginners are soon able to do six thousand, at all events from reprint copy.

One objection offered to the Linotype is with regard to corrections and alterations. An operator can correct his own errors before casting the bar, but for corrections made on the proof, the line must be reset and recast. This, however, is not so serious a matter as it seems, and the whole process does not occupy longer than for a compositor to correct his movable types. And the metal of a spoiled bar is not lost—it is simply thrown into the melting-pot and used over again.

In a general way, it may be said that a Linotype operator ought to be able to produce as much matter in an hour as a typewriter. At any rate, here we have an invention of world-wide importance, inasmuch as it undertakes to expedite and economise in a hitherto unattained manner the dissemination of literature. Up till now it has been chiefly applied to newspaper printing, because of its supposed limitations. But there are those who confidently predict the universal use of machine composition even for the finest book-work, with a consequent further cheapening of literature—marvellously cheap as it is already. Whatever is to be its own future, however, the Linotype has upset the time-honoured industries of the type-founder and the type-setter, and has inaugurated an entirely new era in the history of printing.

## A BY-WAY TO FORTUNE.

### I.

THOUGH the affair attracted much interest at the time, and many reports, some of them highly imaginative, were circulated through the district, there is, I believe, no one so competent to give a plain, substantial account as myself; for I was present at the Alpha and Omega, the first and the last scene.

'It all comes along of this new eddication,' said the village cronies (we were in the fifties then). 'If he hadn't a' been eddicated, he couldn't a' done it.'

'Eddication' or no, the news fell like a thunderbolt on our country-side: the Squire's house broken into, his old butler wounded, and, chief of all, the famous diamonds stolen! Simple folk could scarcely realise a parallel audacity; as for our village constable, he was fathoms out of his depth even in the shallows of such a mystery. Special men came down from London for the case, and, after a month's silence, a development was arrived at.

Many years have passed—more, indeed, than I care to reckon—since that eventful afternoon, yet the memory of it still lingers with me vividly, for I was but a stripling at the time, and unused to the harsh realities of the world.

Picture to yourself an autumn day, quiet on the ear, but raw and damp to one's flesh, with little drops of water hanging from every brown leaf, and clouds of steam rising from the horses' backs, and behind them your servant, ploughing alone in a far outlying field. There could be few more solitary tasks, for, the place being remote and wild, you might work there a year and a day without hearing the sound of a man's voice. At the bottom of the field ran a strip of wood about three hundred yards wide, and extending a mile or so up the valley. As I plodded slowly in the furrow, I whistled to myself for company's sake, and had thus got well into the swing of my labour, when, turning on one headland, I caught sight of three figures creeping down the field under the shelter of the opposite hedge. As they reached the spot to which my ploughing led me they halted, and watched my steady progress across the field towards them. They were fine, strong men, I noted, respectfully clad in sober-coloured clothes. Inexperienced as I was, in their stalwart upright bearing, the squareness of their shoulders, their heavy clean-shaved jaws and fixed expression, I recognised, through the civilian attire, that most curious and at times terrible product—the disciplined man. As I drew my horses up, one, who appeared the leader, and carried, I remember, a smart little cane, which he bent before him in both hands, spoke to me.

'Farmer Hazlitt's son, I believe?' he said.

I replied that was so.

'Well, Mr Hazlitt, your father,' he continued, 'down at the farm, told me you would give some information.'

I was at his disposal, I said.

He kept under the hedge, and spoke in a low tone, yet the words were distinct, and his manner to the point.

'First then, is that Croomley Wood?' he asked, pointing to the lower side of the field where the land sloped into the valley.

'Yes,' I answered.

'Do you know it well?'

'As well as any person in the parish, for very few go there save the gipsies for firewood.'

'How many paths are there in it?' was his next question.

'Only one.'

'Could a man push through it elsewhere?'

'It is possible, of course,' I said; 'but you would hear him half a mile off.' He appeared pleased at my answers, and nodded a sharp 'Good.'

'Now, where does this single path run?' starting again.

'About six yards in the wood from the bottom of this field.'

'Then if I stand down there I cannot miss seeing or hearing any one who passes through the wood.'

'No,' I replied.

'And if any one comes from that direction'—he pointed across the valley—'it will be also impossible?'

'Yes; but in that case,' I added, 'I should

myself catch a glimpse of them from here, as the path rises almost out of the wood for a few yards at one place.'

'Good,' he said once more; 'it is a pleasure to question you, Mr Hazlitt. One thing more let me beg of you, and that is to oblige me by going on with your plough as if you had not seen us. A look, a word from you at a critical point might spoil one of the prettiest bits of work ever put up.'

I said he might rely on me.

'If you see anything, don't see anything, but keep your horses moving,' were his last rather enigmatical words.

They went, falling naturally in step and in line, down the hedge, whilst I pulled my team round for another turn, and so had my back to them till I had crossed the field. When I again faced in their direction, I saw that they were concealed at various distances along the top of the wood, and that two comrades of the same substantial build had joined them, making in all five. Journeying from headland to headland in the usual stolid fashion of men that follow the plough, I could not help fancying that I was in a manner playing the part of decoy to some unsuspecting wretch; but, reflecting it was none of my business, I persevered on my way to and fro. Thus about two hours passed. What happened then?—nothing but the crowing of a cock pheasant, answered almost immediately by a rick from another part of the wood. Had not my eye chanced to rest at that moment on the only one of the five watchers distinctly visible to me (the man whose questions I had answered) the thing would have passed me unnoticed. He (the watcher) had made himself fairly comfortable even among the dripping branches, with the smart cane stuck in the ground before him, and a short pipe in his mouth. On the first pheasant-call he put the pipe smartly in his pocket and changed his position stealthily to one of extreme readiness. So long as I faced towards the wood I could, of course, be keenly on the alert without betraying it; but in the return furrow this was impossible save by breaking my promise in looking round. I resisted the temptation till half-way across, when an uncontrollable impulse led me to drop one of the lines and thus obtain an opportunity of glancing behind me. It was the affair of a moment, it is true, but I saw the figure of a woman flitting hurriedly along the wood-path; she carried a small basket under her arm. 'Martha Foster—Ned the poacher's wife,' rose instinctively to my lips. Another yard and she was hidden by a thicket. I was so surprised that I made no attempt to continue ploughing, but stood staring at the opening through which I had seen her. A deep and, to me, solemn silence reigned; then a startled magpie fled chattering from the branches, followed almost immediately by the shrill scream of a woman, and a yell, half rage, half defiance, so intense, so savage, that I scarcely thought it came from a man, but rather from some wild animal at bay. Scream after scream thrilled me as, leaving my team, I rushed down to the wood. At a broadening of the path three figures were struggling with a prostrate man; two others held a woman back, who clawed and shrieked like a fury; on the ground lay her basket, with the food it contained scattered



and trodden in the drifts of damp, sodden leaves. There was a sharp metallic click, and the three stalwart men rose, leaving their prisoner handcuffed on his face.

'Come, missus, be reasonable,' said the leader; 'you'll only do him harm now.'

Even she cowered before their calm, machine-like impassibility, and her cries subsided to a low moaning. They lifted Ned Foster to his feet, put their clothes, disordered and muddy from the encounter, to rights, lit their pipes, and exchanged a few words, such as: 'Smart bit of business;' 'Very pretty indeed;' 'Glad to hear that pheasant-call,' and so forth. 'Now then, my lads, fall in and let's be marching,' said the leader, picking up his cane.

Since his capture Ned Foster had preserved a sullen silence, but now he growled out: 'What's this along of, mates?'

'Squire Venne's diamonds and wounding his butler,' was the brief reply. 'Come, best foot forward, or we shan't reach in till dark.'

Before they left the fields to enter the closed-in lanes, Ned Foster turned for one last look at a white cottage standing alone in the fields across the valley, whence the woman had come bringing the food that led to his capture—the home which should know him no more. But his wife, following last and unguarded—for they had no fear of her attempting to escape—let her eyes wander neither to the right nor left, nor indeed ever lifted them from the prisoner, who, with hands crossed before him, strode doggedly beside his captors.

Thus the curtain falls on Alpha, the first scene in this history. Before telling the second and final, I must pause to give a few, very few words of explanation.

Squire Venne was a gentleman of ancient family, moderate estates, and emphatic pretensions to social position. There were two things for which the Vennes had, during many years, been distinguished, both to their county friends and to our village folks—first, their chronic impecuniosity, and the straits they were often put to as a result; secondly, the famous family diamonds, which Mrs Venne wore on every possible occasion, to the great comment of other county ladies. Many a time had financial storms arisen, which threatened to swamp Squire Venne and his house for ever, unless the famous jewels were sacrificed to still the troubled waters. Yet when all seemed lost through this unaccountable obstinacy, at that very moment, by some mysterious negotiations, other expedients were always found; and though report often had it that at last the diamonds had been sold, with the next Hunt Ball Mrs Venne was again the envy of her neighbours.

The surprise in the village at the capture of the poacher was very great, for it was not thought even that he was in the district, as he had set out (it was now remembered against him) with great ostentation up-country in search of work a week before the robbery, and had not been seen since. Having always been a morose, sullen man, not much pity was felt for him by his neighbours, though a distinct note of elation might be generally observed that, after all, the affair was the result of local talent.

Ned Foster was in due time tried, convicted, and sentenced to be transported; the evidence of his

guilt was absolutely conclusive. Martha Foster, against whom lay nothing beyond taking food to her husband, was discharged, when she returned to live alone in the old white cottage.

So far success had attended the efforts of the police, but one important feature of the case remained unsolved—the jewels had not been traced. Fragments of their mountings were found on the person of the prisoner, yet threat or promise was alike powerless to induce him to disclose his knowledge or produce any effect save a savage snarl at their impotence. The prevailing impression was, that he had a confederate in some accomplished rogue, who was doubtless the designer of the whole plot, and who had undertaken the disposal of the gems. Precautions were therefore taken by the officials to keep a watch on all known channels through which such goods might be expected to pass—as I have said without result.

In spite of this fact, Squire Venne used every influence he possessed to obtain a mitigation of the sentence. It was, he said, a painful thing to him to feel a fellow-creature doomed to the horrors of transportation for those wretched jewels. This also was in vain; and so Ned Foster was buried under the shadow of the convict prison in the prime of his life, whilst the famous diamonds remained securely concealed from the world's eyes. Winter drew to summer, and summer in turn to winter, and so many times over, till people forgot the great robbery at the Hall, or, if they did recall it, were doubtful whether it happened in the year '55 or '53; and still the convict worked out his punishment, and still the diamonds glittered unseen, unknown, from their hiding-place.

## II.

It is a long *entr'acte* to my second scene—fifteen years. In such a space changes come to even a country village. Time did not spare ours. Martha Foster had died; the close of her life was passed in solitude, half forced on her, half sought, but utter and complete. The white cottage had fallen into ruins; doors, window-frames, and later even rafters were burnt by wandering gipsies on their camp-fires; cattle sought shelter in it from rain and sun; over the hearth a stout elderberry-tree shot up, showing its branches above the four bare walls that alone remained partly intact; in the garden before the house rabbits from Croomley Wood sported at dusk—they had little to fear now from Ned Foster, the poacher. Yet, if in some places age, decay, and death had sown their desolation, in others the signs of new work and progress appeared: a school, a public-house, a railway, marked their different aspects. It was from the nearest station on this line that I found myself trudging one dark night. The season was a rainy one, I remember; the day, like many of its fellows, showery, and though it was fine when I left the little platform, the clouds now threatened an outburst at any moment. I am not a timid man, yet many times in that walk through the wet, muddy lanes I glanced over my shoulders uneasily into the darkness. I fancied continually that I caught the sound of footsteps at a measured distance behind me; pausing to listen, there was nothing but a tremulous rustling of leaves before the rain. About a mile from home I reached a field-path

in crossing which a considerable saving in time and labour could be effected by those who knew it well enough to travel by night. After a moment's hesitation—for the nervous feeling still had a grip of my mind—a few large spots of rain urged me to immediate decision; so, leaving the road, I pushed on at a swinging stride along the lonely footpath. Down came the rain in heavy thunder-drops. Recalling thankfully that my way led by the ruined poacher's cottage, I quickened pace and neared the four bare walls at a run. Had I gone inside there would have been more shelter, but the darkness of the interior looked so blank and eerie that I merely crouched under the outside masonry, comforting myself with the thought that the shower would probably be as short as it was fierce. I might have stood there five minutes, when a noise, the clink of a nailed boot on stone, startled me. Peering in through an opening where two of the walls had gaped apart, I saw, to my astonishment, a faint light shining. This speck, growing larger and brighter, resolved itself into a candle flickering from a nook of the dilapidated fireplace; beside it, as if waiting for the feeble wick to gather force, stood two men. A tangled mass of creepers drooped across the gap in the sides of the cottage, and enabled me to watch intently their movements without much risk of being observed; for which, when the light fell more strongly on them, I felt very grateful, as their appearance did not invite confidence. Beyond this one mutual trait, they were types of men as unlike as possible. The nearest to me was of small build, unmistakably Jewish in countenance, and dressed in shabby smart clothes, from which he now scraped recent mud-splashes carefully; the other had a powerful frame, a hard worn face, wild eyes, and unkempt grizzly hair. He looked like some ragged outcast, and carried, I noticed with alarm, a short iron bar. This man stood shading his eyes with one hand, whilst he gazed round the deserted home.

'To come to this!' he said in a hoarse voice.

There was a long silence, broken at length by the other. 'Hold up, my friend; you learnt what to expect,' he said, flicking himself with a red silk handkerchief.

'They told me that she was dead; they told me the old house was fallen; but could a man a' believed this?—trees growing from the hearth, beasts of the field treading through it as they will.' His voice rose in pitch at each word.

'Hush! somebody might hear us, my friend; you know we have got better work on hand to-night than crying over spilt milk.' He spoke with a cunning power in his voice.

'Ay, you're right, my lad,' cried the elder man, his voice changing at once; 'that's all gone and done with. I've paid the price—fifteen years of hell, and this'—he waved his hand round the ruins; 'but it's my turn at last. Such sparklers, my lad, such sparklers!'

'Now you are talking like a man should,' approved the other, nodding his head, 'so let's get to business; that fool in front of us on the road has delayed it more than enough already.'

This was the home-coming of Ned Foster, and thus I chanced to be a spectator of the sequel to the great diamond robbery.

At the Jew's last request, Ned Foster now took

a step forward, then stared round the four tumble-down walls in a vacant, bewildered fashion.

'Well, what's the matter now?' asked the Jew in a querulous tone.

'It is all so broken down, there's no trace even of the stairs. I can't fix the spot.'

His companion bit his lips in vexation, but replied in the same cool, even manner: 'Come, pull yourself together, friend; this is no way of doing business. You buried them under a flag at the bottom of the stairs, you say?'

The returned convict nodded.

'Can you remember where these stairs stood?'

'Between the two rooms about here, I think.' He walked two-thirds down the cottage and hesitated.

'Well, then, one room must have been much larger than the other,' said the little man, closing his eyes shrewdly.

'No, they were both about the same size; leastways this was a bit the biggest,' replied Ned Foster, pointing helplessly to the smaller third of the interior which he had marked as cut off by the stairs. From his dazed expression it was plain to me that his memory had almost entirely given way. The Jew jumped up in a sudden paroxysm of rage. 'You fool,' he shrieked, 'if the stairs are where you have placed them, how can that be the largest room?'

There was a long pause while Ned Foster rubbed his forehead despondently, and the other paced up and down to regain composure.

'Come, this is no way of doing business, friend,' again said the Jew. He scanned the convict's face long and thoughtfully, after which he started the most extraordinary cross-examination I have ever heard, putting one question after another, and perceiving the coming answer so rapidly that the man before him had not time to form his words ere he anticipated them and passed to another query. They ran something after this: 'Now, friend, in a sharp voice, 'which room did you live in? which room did you see the light in of nights when you came home from work? This, you say,' as they walked to the end of the cottage indicated. 'Now where did you have your table? In the middle of the room?—right, friend. When you sat at your supper, were you near the fire? About a yard and a half off, was it? Very well, then, we may put one side of the table here.' He marked the distance off from the old hearth by a stone. 'How broad was this table? A little over a yard, you think, friend.' He again placed a stone to mark it. 'Now was there anything between this side of the table and the wall? A dresser where your wife kept her crockery?—good. Could you pass easily between this dresser and the table? Yes. Well, we will give it this much, and, adding a yard for the width, it will bring the wall here,' placing another stone.

So, after similar measurements in all directions and innumerable questions, a complete ground-plan of the cottage was obtained, and finally a certain spot located under which the Jew confidently asserted was the particular flag-stone they required.

The consternation of the convict had now left him; a feverish eagerness prevailed in its stead, and he fell to the excavation of earth and shallow masonry, which had accumulated to some depth

over the stone floor of the cottage. It was heavy work, and the single tool they had was of little assistance to them; so, unwilling as he seemed to be, the worker was soon compelled to relinquish the task to his companion, who continued it in a much more leisurely style. Ned Foster now squatted down, holding the candle, and presently, when his breath had returned, spoke again:

'When I remember all I've gone through for these diamonds and how little you've done, it makes me wonder how I ever came to share 'em with you,' he said, musing gloomily.

The Jew straightened his back for a moment as he replied, contemptuously, 'You—what can you do without me, friend? Get caught over the first stones; get a shilling where I can give you a pound. Where would you have been just now if not for me?' He spat as if disgusted, and resumed his work. The convict continued to mumble and wink at the candle till he spoke aloud once more:

'I don't go back on taking you in; it's only—only'—

'Only what, friend?'

'Only, if you should try to cheat me over them, my lad,' his voice going very low, 'nothing could save you or hide you from me or keep me off you. I've waited fifteen years for these, I'd wait fifty for you. I'd have your blood if I followed you to'—

'Come, friend, what's the good of going into all this?' interrupted the Jew; 'it's not business, I say.' He spoke soothingly, but the gleam of his black eyes flashed to where I stood.

Presently, when they had dug down about two feet, I caught the ring of iron on the flags.

'Let me come down to it now, do you hear?' shouted the elder man so eagerly as almost to threaten.

'Just as you please, friend,' was the cool reply; 'you could have done it all if you liked. Have we hit the right flag-stone?'

Ned Foster nodded—he seemed too full for speech—and began to use the bar as a lever, for which purpose it had evidently been brought. The stone was soon prized up, and going down on his knees, he burrowed in the earth underneath with his hands. First he drew out a rust-eaten gun-barrel; then a bundle of game-wires, the rotting pegs still dangling from them; after that the gun-stock, and a steel gin or two. On each of these coming to light they laughed excitedly; but a long, anxious silence followed as he searched for something lying still deeper. It was a strange scene: the two men in this desolated house, through which the candle shed a quivering light, throwing up vividly the dark alert features of the Jew who held it, whilst it imparted an odd, fantastic appearance to the other's bent figure, half hidden in the earth; the whole framed by the outside darkness and the stillness of night, for the rain had long ceased.

Suddenly Ned Foster sprang up with a cry, grasping a battered tin shot-flask. I could hear the rattle of hard objects inside. His senses seemed to leave him, and he ran to a corner by himself, clutching the canister to his body, as if afraid the air might rob him of his treasure. The Jew's face had flushed too in the first moment, but he sneered now at his companion's frenzy, and without a word started to push the earth and flag-

stone into the hole. Meanwhile the convict, recovering somewhat from his overpowering emotion, knelt down where the earth was smooth, and pulling a dirty rag from his pocket, spread it out before him; then he twisted the top from the shot-flask, and poured the diamonds glisteningly one by one on the rag. Every now and again I caught a sparkle as the candle-flame trembled in the air. This sight overcame the apparent indifference of the Jew, for he drew near and watched the little heap grow slowly larger with a fascinated gaze.

'How many more have you got there, friend?' he asked almost in a whisper, as the other paused and looked up in his face.

'More—twice as many—three times as many.' He shook the flask and laughed.

I don't think that the past fifteen years and the ruin they had brought with them weighed on the convict's mind at that moment. The man standing knelt down beside him, and taking a few stones in his hand, examined them with the air of an expert, the other eyeing him suspiciously.

A long, a very long pause ensued. At length the Jew regained his feet. As he turned, I was almost startled into an exclamation that must have betrayed me, his features had such a ghastly expression. He took two or three hasty turns up and down, and pulling a bottle from his coat, gulped down the contents like a man with a fever thirst on him. Ned Foster's eyes never shifted, but still no word was uttered.

'Friend,' said the Jew at length, 'do you know what share of those stones I want?'

There was no reply.

'I don't want one, not one; you can keep 'em all,' he snarled, showing his teeth.

Still no answer, but the convict ran his hand through the stones; it seemed as if he failed to understand the words spoken to him.

'I am counted a good judge by my friends in the trade,' continued the Jew, 'and I think if you sell them well—very well, mind—they will about pay your fare to London. I shall try and find the way back myself. Don't ever come near me again. I might—I might do you harm, my friend.' He stepped out into the darkness with the most venomous contortion in his face human creature ever bore. As for Ned Foster, he took not the slightest notice, but continued to play with the spurious gems, uttering at intervals a low, gleeful laugh.

I comprehended then how Squire Venne had managed to pay his debts, and enable his wife still to wear diamonds, if only of paste.

Thus ended Omega, the final scene of this tragedy; what remains is of the simplest. In one of Squire Venne's almshouses lived for a few years a broken old man, oblivious of all—name, birth-place, career—whose sole remaining impulse was to guard and surreptitiously play with a handful of paste diamonds. To the day of his death none save the squire, himself an aged man, and the writer, recognised in him Ned Foster, the ex-convict. He lies buried by his faithful wife, Martha.

By-ways to fortune, easier-travelling, shorter though they may seem than the high-road, 'the straight way and the true,' along which slow and honest folk plod, generally turn out very rough

and tortuous paths indeed, their wayfarers often losing themselves in a valley, misty at its mouth, and ending in a great darkness.

### THE MONTH:

#### SCIENCE AND ARTS.

THE close of the year 1896 has been rendered memorable by the introduction in our streets of the horseless vehicle. Considering the state of the roads and the adverse weather conditions, the race of these vehicles to Brighton must be regarded as a success; and it is certain that many of them attained a high, indeed a dangerous rate of speed, compelling expert riders on bicycles to fall very quickly into the rear. The spectacle was a remarkable one, if only on account of the vast interest it excited, as was evident from the tens of thousands of spectators who lined the roads through which the vehicles sped. These auto-cars are of all sorts and sizes, and now that excitement has been allayed by their appearance in such variety, people will be interested in watching that process which is inseparable from all things human, the survival of the fittest.

In this connection, and as supplementary information to the article in last month's *Journal* on 'Mechanical Power for Tramways,' the remarkable offer made to Glasgow Corporation Tramways is worthy of attention. Mr George Johnston, of 94 Hope Street, Glasgow, in conjunction with Sir William Arrol, of Forth Bridge fame, has offered to equip every tramway route in that city with cars driven by mechanical traction, and to run these for a period of seven years, at a cost to the tramway department not exceeding what it at present pays for horse haulage. At the end of seven years the promoters undertake to hand over to the Corporation, as a free gift, the whole of the cars with their motors, in good working condition, and free of any charge for royalties. It is calculated that horse haulage costs £100,000 per annum. Should the Corporation decide, after a month's trial, that the cars are unsuitable, they shall be withdrawn, and the community held in no way responsible for the expenditure incurred. The committee seem to have been predisposed in favour of the overhead electric wire system. As soon as the home and foreign patents are completed, a description of this new motor will be forthcoming. It is, we understand, an oil engine, of entirely novel description, which minimises the trouble with obnoxious vapours, and electricity is substituted for ordinary flames, to ensure combustion. The motor is very light, and runs at high speed, while all the mechanism which is required is carried on a four-wheeled bogey below the car; and this bogey is free to adjust itself to the various curves round which the car is passing. Further developments of this motor will be awaited with interest.

Another improvement in electric traction is reported from Liverpool. Mr Alderman Snape draws our attention to a 'Simplex Electric Conduit' traction for tram-cars just invented, which promises to overcome some of the difficulties connected with underground electric traction on tramways, and for which an experimental line has been laid down at Prescott, near Liverpool. For this system it is claimed that it has all the

advantages of the overhead-wire system, without its attendant inconveniences. The line looks like the ordinary Liverpool tramway lines, save that in place of one of the rails a 'split' or double rail is substituted, the aperture or slot permitting the electrical collector of the car to make contact with the copper cable or electrical conductor concealed from view in a conduit beneath the rail. The initial cost of laying this tramway is, of course, greater than that of the overhead system; the cost of working it will be, it is promised, less by about threepence per mile per tram-car than with horse traction.

Those who are accustomed to the use of toilet requisites, even if they confine their attention to simple violet powder, should note that at a recent conference of hairdressers certain statements were made which are worthy of their attention. First, with regard to that same innocent violet powder which is so largely used by ladies, and which is showered so plentifully on the tender skin of infants of both sexes, we learn that it is no longer composed of rice, but is often a mixture in varying proportions of white lead, chalk, starch, and alabaster. The hairdressers express a hope that the sale of this noxious stuff should be prohibited; and the *British Medical Journal* backs them up with the useful suggestion that the chief constituents of every cosmetic sold should be stated on its box or bottle. It is well known that the application of metallic ingredients such as arsenic and lead will often lead to paralysis of certain groups of muscles, one reported case being that of paralysis of the muscles on one side of the neck from the use of a hair-dye containing lead. It is stated, too, that some years ago, in a village in Essex, a number of children died through using a violet powder, which, on analysis, was found to contain 38 per cent. of white arsenic.

There is a widely-spread belief that good horses, when they die, go, not to Paris, but to some Continental town, where their bodies are boiled down into 'Extract of Beef.' A representative of the *London Daily Mail* recently determined to test the truth of this oft-repeated tale, and has found it to be false. Following a horse which was shipped to Rotterdam for this alleged purpose, he found that the animal was taken with others to the public abattoir there, and at once slaughtered. Those which were sound were sold on the spot to the local horse-butchers. He then obtained a certificate from the director of the abattoir stating that all horses shipped from England to Holland are treated in this way, and that there is not to be found in the whole country a single factory where extract of horse-flesh is made.

A most interesting account of the Kimberley diamond-mines was recently given by Professor W. Crookes, F.R.S., at the Imperial Institute, in the first of a series of lectures dealing with that important subject. In the course of his remarks, the lecturer stated that Natal contained more coal than Britain owned before a single bucket had been raised. Professor Crookes had studied diamonds scientifically for twenty years past, and he had lately spent nearly a month at Kimberley, the centre of the diamond-producing area. This place was more than four thousand feet above the sea-level, the country all round about being denuded of trees on account of the great quantity of timber used in constructing the mines. The five most



famous of these mines were comprised in a circle of three and a half miles diameter, and the diamonds were found in 'pipes' or volcanic 'necks' of irregular shape and of unknown depth. These necks were filled with a heterogeneous mixture of about eighty different minerals, which resulted in a hard mass, or 'blue clay,' in which the diamonds were embedded. Before the accidental discovery of these pipes there was no indication above-ground of the vast treasures which lay stored below, the enormous value of which might be appreciated when it was stated that two claims, measuring sixty-two by thirty-one feet, worked to a depth of a hundred and fifty feet, had yielded 28,000 carats of diamonds. At present the diamond industry was chiefly confined to the neighbourhood of Kimberley, but recently a 'pipe' had been discovered forty miles off.

In issuing regulations for the keeping, conveyance, and use of 'mineral spirit' (petroleum) in connection with light locomotives, the Home Secretary calls attention to the dangers which may arise from the careless use of the more volatile descriptions of petroleum to which the rules apply. Persons who have had no experience of chemical laboratory work do not readily understand that some of these volatile liquids give off an inflammable vapour which will travel to and take fire at a flame which may be several feet away from the vessel in which the liquid is stored. This vapour, moreover, forms with air an explosive mixture which is capable of most destructive effects. Hence the necessity for the greatest care in handling these liquids, for thoroughly sound and properly closed vessels to hold them, and the rule that they should never be dealt with in the presence of a naked light.

Mechanical draughtsmen, decorative designers, and others have long wanted a ready means of striking an ellipse, or an oval, as it is commonly, but incorrectly, called, and they generally resort to the rough method possible with two pins and a piece of thread. Such a method cannot be advised where accuracy is required, nor can an ellipsis of small size be attempted in this manner. Mr Thomas Moy's ellipsograph is designed on quite a new principle, and by its use ellipses, down to the very smallest sizes, can be readily drawn, the diameters being adjusted by screws and travelling nuts. Moreover, by a simple alteration of one portion of the instrument, it is adapted for copying or drawing toothed wheels, &c., in sufficiently good perspective to meet the requirements of all but the most fastidious artist. The instrument is small and compact, can be carried in a pocket-case, and is cheap. Its inventor's address is 8 Quality Court, Chancery Square, London.

Lieutenant Ramos, of the United States militia, has recently returned to New York from the scene of the Cuban insurrection, where he had the care of a dynamite gun, manufactured in the last-named city. He gives a ghastly account of the efficiency of this terrible weapon in actual warfare. In the first action in which it was employed, the opposing forces occupied positions on hill-tops, divided by a valley. The Spaniards were busy erecting breastworks when the dynamite gun was trained on them, the second shot from which landed in their midst. In the result thirty men were killed, two cannons were shattered, and the breastworks utterly destroyed. In another engage-

ment this awful weapon fired only five rounds, but it felled the trees, destroyed all vegetation where the shots had struck, and tore its victims limb from limb. Finally, the gun was used at the battle of Guayabita, on which occasion the Spaniards were 12,000 strong, and the Cubans less than half that number. The Cubans were being defeated when the gun arrived. Seven shots sufficed to turn the threatened defeat into a victory, and these seven shots cost the Spaniards a hundred and fifty men.

The modern skater in this country has few opportunities of practising his beloved pastime, for the ways of winter are erratic here, and a promising frost is too often followed by a thaw just when the ice is thick enough to bear. A remedy has been found in real-ice rinks, but these establishments are necessarily costly to maintain, and are not for the multitude. Some years ago in London an imitation ice surface, prepared with certain salts of soda, was tried with indifferent success, but quite recently the idea has been revived in improved form. It is not pretended that this chemically-prepared rink is as good as real ice in first-class condition, but it has a distinct advantage in not requiring constant renovation. In appearance the imitation substance resembles ice which has suffered from a slight thaw, but the surface is in reality quite dry. The exertion of skating over it is somewhat greater than that called for in traversing real ice.

The constantly recurring accidents due to the use of cheap mineral oil lamps, and more especially those having easily fractured glass containers, have stimulated the invention of many an improved form of lamp, some of which have from time to time been described in these columns. Another one has just been patented by Mr Yorke, of Hadleigh, Suffolk, who has sent us particulars of the construction of the lamp which seems to meet all requirements. But the difficulty is to make the ignorant poor aware of the risks they run in using cheap lamps of the ordinary pattern. It is certain that the evil will not cease until the legislature steps in and forbids the sale of any lamp which does not fulfil certain requirements laid down by authority. It would seem, too, that a great many accidents are due to the employment of dangerous oil. We by no means advocate grandmotherly government, but there is a large class of persons who daily run terrible risks to life from their own ignorance, and they should be safeguarded just as children are.

Contrary to general belief, the ruby stands pre-eminent as the material which embodies the highest money value in the smallest possible compass, a stone of five carats being from ten to twelve times the value of a diamond of the same size, although the latter may be of the first water. So, lately, said Professor Judd in the course of a lecture on 'Rubies, Natural and Artificial.' Still, larger rubies exhibit even greater excess in value when compared with diamonds of their own size. The so-called 'Great Ruby' in the British crown is no ruby at all, but merely a spinel. Upper Burma has been long known as the place where the finest rubies are found, and there is also found the beautiful red stone known as the rubellite, which is valued above all other gems by the Chinese, but is disregarded by Western jewelers. The Burmese carry on their mining opera-

tions with the most primitive appliances, and the adoption of modern machinery requires grave consideration, for the gems are scattered through the limestone rock, and if blasting were introduced many of them must infallibly be shattered. In conclusion, Professor Judd dealt with the tests applicable to natural rubies to distinguish them from artificial stones.

Primary batteries without number have been invented, described as giving better results than any contrivances of the kind before known, and have then sunk into oblivion. If all reports be true, a different fate is in store for the battery invented by the Brothers M'Donald, which is now being placed upon the market by the M'Donald patent electro-battery syndicate. The single cell consists of an outer vessel packed with cinders and coke, and filled with a solution of copper sulphate, the inner cell of a porous pot containing a rod of zinc in a solution of common salt. The porous cell is surrounded by a spiral of thick copper wire. A pamphlet descriptive of the cell, and the work which it will do, together with reports of experts upon its behaviour, has been issued by the syndicate.

The ever-recurring nuisance and loss occasioned by the opening of roadways for the purpose of laying and repairing sewer, gas, and water pipes and, more recently, electric mains, gives interest to the proposal lately brought before the London County Council with regard to the establishment of subways under the main thoroughfare for the accommodation of such pipes, &c. In all new streets such subways are produced as a matter of course, and the dwellers therein suffer no inconvenience from upturned roadways; but the proposal before the Council was to establish such tunnels beneath the old thoroughfares. One estimate places the cost at £46,000 per mile, and another at double that sum, but the latter includes reconstruction of sewers and the relaying of pipes and new mains. For the present the proposed scheme will not be proceeded with, the Council considering that it would encounter fierce opposition from the various companies concerned, as it certainly would from the long-suffering London ratepayers.

It is believed that the Rinderpest, which has been the indirect cause of so much trouble in South Africa of late, is a disease which can be best conquered by an inquiry into its possible bacterial origin. With this view, the Cape Government invited Dr Koch, the eminent bacteriologist, to proceed to Cape Town and investigate the question, in the hope that a method of prevention may be discovered. Dr Koch, with the approval of the German Government, has undertaken this important mission, accompanied by a trained assistant. These gentlemen arrived at Cape Town at the end of December.

The modern engineer seems capable of achievements which in the days of 'once upon a time' were only possible by the help of fairies or magicians. An instance of this was lately afforded by an engineering feat which was performed on the Great Eastern Railway during one dark and rainy night. A bridge had to be removed and replaced by a new one, and, incredible as it may seem to be, the work was actually completed in nine hours. At 1.30 A.M. the rails were removed with the upper cross

timbers. An hour later the men were at work lifting out of the way twenty iron girders which each weighed six tons. Next, the new bridge, which had been erected on staging alongside the old one, was slowly hauled into position by the aid of powerful winches, and lowered, a mass weighing 300 tons, on to the permanent supports. The rails were then laid, with only a slight delay to the first train which ran on Sunday morning.

A new system of telegraphing without wires was recently referred to in a lecture by Mr W. H. Preece, of the Post Office. We cannot say that he described the system, for, as the necessary patent formalities were not completed, his tongue was tied. The new method is due to the inventive genius of a young Italian electrician, Marconi by name, who has constructed apparatus for generating and for receiving electric waves, which travel in straight lines through space, which can be reflected and refracted, and which in every way behave after the manner of light. In the lecture-hall two boxes were exhibited, in one of which the waves were generated, while their reception in the other was signalled by the ringing of a bell. Mr Preece believes that this novel method of communication will prove to be of inestimable value in conveying messages between ships, and especially between ships and lighthouses. Experiments recently carried out show that communication is possible with these instruments at a distance of at least  $1\frac{1}{2}$  mile, and that neither rain nor snow acts as a check to the transmission of these curious electrical waves.

## FRUITS OF PARADISE.

By DR D. MORRIS, C.M.G., Royal Gardens, Kew.

UNDER the title of Paradise Fruits, Dr Macfadyen, many years ago, described some interesting members of the Orange family. Their origin was not clearly traced, but there was little doubt that they had been produced by seed variation in the West Indies. Their nearest relations were the common Shaddocks or Pamelows (*Citrus decumana*). These are well known as the largest of the Citrus fruits; some fine specimens have weighed as much as twenty pounds, and measured two feet in circumference. According to Alphonse de Candolle, 'Shaddocks and Pamelows are probably natives of the islands east of the Malay Archipelago.' They were found in a wild state by Seemann and others in the Fiji Islands and the Friendly Islands, so there is little doubt of their Polynesian origin. They are now distributed in most tropical countries, but, except in a few localities, they are not so highly esteemed, for instance, as the best oranges. Usually the skin is thick and pithy, and the pulp bitter, and there is little or no demand for them in commerce. The Paradise fruits, on the other hand, are in great demand, and they are regarded as the most refreshing and wholesome of any of the Citrus family. Recently, in New York, some of the latter were retailed at almost fabulous prices, and the demand increases every year. The Paradise fruits, while they fall specifically under *Citrus decumana* or the giant *Citrus*, have many points of merit, not the least of which is the keen preference shown for them by the people of the

United States. They are quite distinct from the true Oranges, Citrons, and other groups of the Orange family.

The typical fruits of *Citrus decumana* are those known in India as Pamelows (a contraction of *porum melo*, the melon apple), called by the French Pompelmousse or Pamplemousse, and by the Spanish and Dutch Pompelmoes. As these fruits were first introduced to the West Indies by Captain Shaddock, in that part of the world they have always borne his name. Pamelows and Shaddocks are only the Old and New World names for one and the same fruit. Sometimes it is stated that the largest fruits are called Shaddocks, and the next in size Pamelows. There is no authority for this distinction. In this place, I shall quote Pamelows and Shaddocks indifferently as convenient popular names for all the largest fruits of the typical *Citrus decumana*. A preference may unconsciously be given to the use of the word Shaddock, but only because it is the most familiar name in the West Indies. As regards the varieties of these fruits existing in different parts of the world, they are for the most part distinguished by the locality where they are grown rather than by any character they may possess. For instance, in India the best Pamelow, according to Bonavia, is the thin-skinned red Pamelow of Bombay. This is a perfectly globose fruit, very juicy and with the pulp of a rosy-red colour. The botanical characters of *Citrus decumana* are perhaps more marked than in any other species. The tree is larger; and both the young shoots and under-side of the leaves are covered more or less with soft down. No other species of *Citrus* has the latter characteristic. The tree may be as high as twenty feet, with a flat crown and many spreading branches. Usually there are no spines. The leaves are distinctly rounded at both ends, with a notch at the apex; the edges are uneven or wavy, owing to the presence of a number of small depressions; the stalk or petiole is furnished with two broad wings, also wavy, and bordered with fine hairs. The flowers are somewhat like those of the orange, but larger, and are both white and fragrant; they usually are in clusters of three to nine. The fruit is spherical or pear-shaped, very large, sometimes even as large as a man's head, and very heavy. The juice is always slightly acid, while the rind in the common sorts is remarkably thick, with a bitter inner membrane. The vesicles containing the juice are very prominent and arranged transversely. In the orange they are hardly discernible.

Pamelows or Shaddocks differ from other *Citrus* fruits in size; they are invariably larger than the largest orange, and, in addition, are compact and very heavy. In colour, they are pale yellow, almost like lemons, but they differ from the lemon in having usually a smoother skin. The flesh is pale-yellow or greenish-white; in some sorts there is a tendency to pink or crimson, as in the so-called 'blood-oranges.' The pink-fleshed Shaddocks, if otherwise acceptable, are more esteemed than the white-fleshed. They are said to be sweeter and more juicy, and have only in a slight and palatable degree the peculiar flavour of the ordinary Shaddocks. Macfadyen, sixty years ago, stated that he always found the pear-shaped Shaddocks better than the spherical sorts. His experience is not invariably

endorsed at the present time. Some of the spherical fruits are of a very delicate flavour, and, as already mentioned, the best of the Indian sorts are not only spherical, but have also a pink flesh.

So far, I have described the fruits of the typical *Citrus decumana* only. When we come to the smaller fruits, we find that both in the tree yielding them, as well as in the fruits themselves, there are certain distinguishing features which show they are rightly separated by Macfadyen, although we cannot go so far as he has done in assigning the plant producing them specific rank. Macfadyen grouped the smaller fruits under *Citrus paradisi*, thus expressing his appreciation of them by designating them the Fruits of Paradise. He distinguished two varieties, to which he gave the names of Forbidden Fruit and the Barbados Grape Fruit. He described the tree as of handsome appearance, about thirty feet in height, with branches sub-erect and sharp at the apex. It will be noticed that in the Shaddock the tree was twenty feet high, with a flat crown and spreading branches. The leaves are oval, rounded, and smooth on both sides. The flowers have linear instead of oblong petals, and the stamens are twenty-five to twenty-six in number instead of thirty to thirty-five. The fruits, as in the Shaddocks, are either spherical or pear-shaped. To the pear-shaped fruits were assigned the name of Grape Fruit, because they usually grew in clusters; while the spherical fruits were called Forbidden Fruit, from a fancied connection with the Garden of Eden. This classification was made by Macfadyen nearly sixty years ago, therefore long before these fruits were so widely distributed as now in various parts of Tropical America. The Forbidden Fruit was known to Tussac in 1824, who called it 'Fruit Défendu ou smaller Shaddock.' Later he refers to the same fruit in the following words: 'C'est une assiette de desert très distinguée et fort saine.' With the exception of the shape, Forbidden Fruits and Grape Fruits are very much alike, but they are both superior to any Shaddock or Pamelow—the fruits of *Citrus decumana*; while the smaller and more delicate fruits bear the distinctive name of Paradise Fruits. Of these the Grape Fruit is the one now so highly esteemed in the United States. The *Penny Cyclopædia* had adopted a similar classification even in 1837. It stated: 'When these fruits arrive at their greatest size, they are called Pompoleons or Pompemousses; when at the smallest, they form the Forbidden Fruit of the English markets. Another small variety, with the fruit growing in clusters, is what the West Indians call the Grape Fruit.'

The Grape Fruit is not a Shaddock nor a Pamelow. It is quite a distinct fruit, and possesses exceptional merits: at its best, it differs from the Shaddock as much as a fine apple from a common crab.

We may be sure that such keen-witted men as the fruit merchants of New York would not give high prices for Grape Fruit unless it were in great demand, and thoroughly appreciated by people able to pay for a choice and delicate article. It is estimated that there were received in the United States last year Grape Fruit of the value of about £20,000. The demand for it is quite of recent date, but it is increasing so

rapidly that in a few years the Grape Fruit will be one of the most valuable of the Citrus fruits in the New World.

There are, doubtless, many inferior sorts of Grape Fruit. In fact, in the West Indies the plants have been allowed to run almost wild. No care has been taken to select the best varieties, or to bud and graft them, so as to keep them uniformly at a high standard. *Garden and Forest*, the leading horticultural journal in America, very wisely advises that, 'wherever the fruit is grown, it should be borne in mind that the highest success will only come with the use of the best varieties. There is no need to grow the thick-skinned and bitter sorts, and those with a dry cottony pulp, while there are varieties both of the apple-shaped and pear-shaped fruits with a silky skin, full of juice, and of a most delightful flavour, with just enough bitter to give it piquancy and suggest its valuable tonic qualities.'

Mr C. B. Hewitt gives the following account of the Grape Fruit: 'At one time it was not thought much of in Florida, being only eaten by the old Floridians as a spring tonic, and to drive away malaria. As soon as its great medicinal qualities were recognised, the doctors began to recommend it for indigestion, and also as an appetiser. The majority of people who eat this fruit do not like it at first, and many have not tried to like it, on account of the bitterness of the pithy membrane dividing the pulp. The correct way to eat this interesting fruit is to carefully remove this lining and eat only the pulp. Some people prefer to cut the fruit open through the middle, take away the seeds, and then sprinkle a little sugar over the cut surface, and work it in with a spoon. Then let it stand for a little time, or overnight, and eat before meals. There is nothing,' continues this writer, 'in the fruit line yet discovered that possesses the medicinal qualities of the Grape Fruit. The demand for it will increase from year to year, and take up all the fruit that will be grown for the next twenty years. As many as six thousand fruits are said to have been gathered from a single tree. This was an exceptionally fine specimen. It was described as forty-nine feet in height, and thirty feet across its widest branches. It was thirty-four years old.' There are many varieties of Grape Fruit, some seedless, or with an occasional seed only.

The Grape Fruit is in such great demand in America chiefly because it has been so highly recommended by the medical faculty for its valuable dietetic and tonic qualities. It is also very refreshing, and is regarded as a specific for dyspepsia. The Americans are large fruit-eaters, and seldom begin or end a meal without fruit of some kind. To supply them with bananas alone, there arrived from the West Indies during the year 1895 one hundred and eighty-five cargoes of this fruit, comprising nearly seventeen million bunches, of the value of over five million sterling. Jamaica furnished the larger share of this immense shipment of tropical fruit, and that island is becoming quite prosperous in spite of the great depression that has overtaken all the sugar-producing countries in that part of the world. Hitherto Florida has supplied a good deal of the Grape Fruit for the American market, but since the disastrous effects of the 'freeze' of last year the Florida plantations have been almost destroyed.

Much English capital invested in fruit-growing in that State has been lost, and many of our young countrymen settled there have suffered a severe reverse of fortune. Even where the groves are not quite destroyed, it will take years of toil and expenditure to bring them back to their former condition. For some time at least the chief supplies of Grape Fruit must, therefore, be drawn from the West Indies. The people in that part of the world would do well to establish trees of the best varieties, and take advantage of the opportunity to participate in what promises to be a steady and remunerative industry. A leading authority in New York states: 'It will be long before there is an over-production of the best sort of Grape Fruit, since the demand for it increases every year, and it is constantly becoming more popular as a breakfast fruit.' A wealthy population numbering over sixty million supplies a splendid market for disposing of such an attractive commodity as this Grape Fruit. Some idea of the prices recently paid for specially choice fruits may be gathered from the fact that two barrels of Grape Fruit realised the extraordinary price of £5 each in New York, and seven barrels of similar fruit sold in Philadelphia, for £5, 10s. each. Such fruit would retail at more than a dollar apiece. This is probably the highest price ever paid for any fruits of the Orange tribe for eating purposes. It clearly proves that a very active demand exists for Grape Fruit, and although prices must necessarily fall, the probability is that, with a careful selection of the best varieties and a judicious management of the crop, the cultivation will be a profitable one for many years to come.

#### A LOVE SECRET.

I HAVE no thoughts that jingle into rhyme,  
Nor any words that musically chime:  
Then, O my sweet, how can I tell to thee  
In language fit, with phrase of melody,  
The secret rare that trembles on my tongue?  
It should be murmured 'neath the pallid moon,  
Or poured in gush of strongest, sweetest song:  
Fair flowers should give it forth with fragrant  
breath;

The very grass your passing feet beneath  
Should for my soul's pure joy glad utterance find,  
And love-birds coo its sweetness to the wind:  
All nature's voices I would call to me.  
Whisper it, streamlet; roar it out, O sea—  
'I love my love, and dream that she loves me!'

City Temple.

EMMA J. PARKER.

#### \* \* TO CONTRIBUTORS.

- 1st. All communications should be addressed to the 'Editor, 339 High Street, Edinburgh.'
- 2d. For its return in case of ineligibility, postage-stamps should accompany every manuscript.
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- 4th. Poetical contributions should invariably be accompanied by a stamped and directed envelope.

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